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ABSTRACT

In a study to assess young children's social interaction with peers, six male toddlers who were the only participants in a playgroup were observed in two situations: (1) a GROUP situation in which at least four of the boys were present and (2) a DYAD situation in which only two boys were present. Both types of observations were made at 16, 19, and 22 months. The videotaped observations were analyzed for three sets of issues: (1) the range of individual differences present in the boys' social behavior and interaction, (2) the consistency of individual performance across the two settings, and (3) the stability of individual rankings between 16 and 19 months and between 19 and 22 months. These analyses indicated a considerable intra-individual stability across time and situation in addition to considerable inter-individual variability. These results are discussed in light of the emphasis most of the recent infant peer studies have placed on normative descriptions.
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Individual Differences in Early Social
Interaction with Peers

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Abstract

Six male toddlers who were the only participants in a playgroup were observed in two situations: (1) a GROUP situation in which at least four of the boys were present and (2) a DYAD situation in which only two boys were present. Both types of observations were made at 16, 19, and 22 months. The videotaped observations were analyzed for three sets of issues: (1) The range of individual differences present in the boys' social behavior and interaction, (2) The consistency of individual performance across the two settings, and (3) The stability of individual rankings between 16 and 19 months and between 19 and 22 months. These analyses indicated a considerable intra-individual stability across time and situation in addition to considerable inter-individual variability. These results are discussed in light of the emphasis most of the recent infant peer studies have placed on normative descriptions.

Individual Differences in Early Social Interactions with Peers

Recent studies (Bronson, 1975; Eckerman, Whatley, & Kutz, 1974; Goldman & Ross, 1976; Mueller & Brenner, 1977; Vincze, 1971) have documented the presence of peer social interaction during the first two years. These studies may be seen as part of an effort to discredit the myth that infants and toddlers are asocial with peers. Some of the recent studies (Becker, 1977; DeStefano, Note 1; Eckerman & Whatley, 1977; Vandell & Mueller, Note 2) have also tried to outline situational factors that might enhance the quantity and quality of the interactions. These studies have examined the effects of peer familiarity, toys, and peer group size on early peer interactions. In both of these types of studies, an emphasis has been placed on normative presentations, i.e., an outline of the overall characteristics of early peer social interaction. Individual differences in early peer social skills have not been examined as extensively; only two of the recent studies have discussed individual variability in peer interaction.

Lee (Note 3) has described the behavioral characteristics of two children whom she designated as the most-preferred (the infant most often selected by other infants as a play partner) and least-preferred (the infant least often selected) babies in an infant daycare center. She noted major discrepancies in the two infants' behavior with their peers. The most-preferred baby was characterized by less intrusive behaviors and was also more responsive to the other babies' social overtures, while the least-preferred baby was more intrusive and less responsive.

Bronson and Pankey (Note 4) have also discussed the possibility of individual differences in early peer interaction. In a paper in which the main focus was the development of a theoretical model of how to study early peer interaction, Bronson and Pankey noted a range of individual functioning during the second year. They also pointed out stability across time in individual toddler's use of agonistic and bimodal (mixture of agonistic and prosocial) behaviors, with some evidence suggesting that this stability increased over the second year.

The purpose of the present study was to further investigate issues raised by Lee's and Bronson and Pankey's work. Specifically, three questions were addressed: (1) What is the range of social skills apparent in a playgroup of boy toddlers?, (2) Is there consistency in the toddler's sociability with peers in two settings?, and (3) Is there consistency in a toddlers' sociability with peers across time? While these questions may be seen as an outgrowth of issues raised by the previous researchers, they include elaborations and variations not included in those studies. Thus, a wide range of measures was included in the analyses of individual variation and the stability of these differences was examined not only across time but also across situation.

Method

Subjects

Six male toddlers served as the subjects. The boys were the only participants in a university playgroup which met three hours a day five days a week. The playgroup began when the boys were 16 months old (± 2 weeks) and ended six months later. During that time, the boys were left

by their parents in the care of two teachers who were instructed to provided an interesting space for the toddlers but not to try and teach peer social interaction or play. Three of the boys were first born (only) children; three were latter born children. The fathers' occupations ranged from skilled craftsmen to professional. All of the families volunteered for the free half-day care because they felt that their sons would benefit from a playgroup experience.

Procedure

The toddlers' peer social interactions were videotaped in two different situations by two concealed cameras. The first situation, P-GROUP, was conducted in the whole playroom as all of the toddlers played together. This procedure was not videotaped unless at least four children were present. The videotaping usually began about thirty minutes after the toddlers had arrived in the morning. For this procedure, the two hidden cameras focused on each child for five minutes using a random order that varied daily.

The P-GROUP videotapes were made during three evenly spaced intervals when the toddlers were 16, 19, and 22 months. At each age, each toddler was videotaped six times for a total of 30 minutes per child per period. The child's P-GROUP performance at each age consisted of the sum of the behavior across the six observations. For all of these sessions, the room was arranged in an inviting manner with numerous large and small toys. The teachers were asked to refrain from initiating interactions with the toddlers during the P-GROUP videotaping.

The second situation, P-DYAD, was conducted in the same playroom as the P-GROUP except that during P-DYADs the room was divided in half by a

movable wall. (In the P-GROUP situation, there were approximately 6 square meters of space per child. In P-DYADs, there were approximately 7 square meters per child.) As was the case in the P-GROUP procedure, the P-DYAD situation was not begun until about 30 minutes after the child had arrived. Then, the spontaneous social interactions of two children who were separated from the larger playgroup were videotaped for 15 minutes.

Three DYAD passes (at 16, 19, and 22 months) were conducted. During each DYAD pass, each toddler was videotaped once with every other toddler for a total of five observations per child per pass (75 minutes of observation per child per pass). A toddler's P-DYAD performance for each pass consisted of the child's total performance across the 75 minutes. As in the P-GROUP situation, the room was arranged in an inviting manner with both large and small toys, pictures on the walls, etc. One teacher was present for the DYAD videotaping and s/he was instructed to not interact with the children during this period.

Coding Procedure

The same coding procedure was used in the analysis of the two situations. The code was basically a written longhand record that preserved the sequence of social behaviors during interaction and the kinds of social behaviors (vocal or motor) used by the children during the exchanges. The Appendix provides each of the definitions used in creating the longhand record, outlines each of the measures extrapolated from the longhand record, and gives the inter-observer reliabilities from ten videotapes which were randomly selected and independently coded by the coders. The coders were unaware on which tapes reliability checks were being made.

Data Analysis

Because of the varying observation durations (30 minutes per child per period in P-GROUP and 75 minutes per child per period in P-DYAD), raw frequencies were adjusted by dividing these frequencies by their particular observation duration (1800 seconds for the 30 minute observations and 4500 seconds for the 75 minute observations) and multiplying by 1000. This procedure yielded frequencies as rates per 1000 seconds, figures that were more manageable than rates per second. These adjusted figures were then used in the comparisons of individual toddlers across time.

Since a purpose of the present study was to investigate stability of individual differences across time and play situation, correlation coefficients were calculated on these adjusted figures. The first set of correlations were computed for the six children's performance in the dyadic and group settings. Separate correlations were computed at 16, 19, and 22 months. Then, within the two types of observation situations (P-GROUP and P-DYAD) correlations were computed from 16 to 19 months and from 19 to 22 months. Since Havlicek (1977) has found that Pearson's r is robust (even with violations of assumptions) for groups as small as five, Pearson's r 's were used in the calculation of the correlation matrixes.

Results

Three sets of results are presented in this section. First, the ranges of individual performance are outlined. Then the relationships between individual performance in the dyadic and group situations are outlined. Finally, the results concerning stability of performance across time are presented.

Range of individual performance

As shown in Table 1, there was considerable variability across the boy toddlers' social behaviors. This variability was apparent in both the frequency and proportion measures. Within the frequency measures,

Insert Table 1 about here

for example, children varied widely in the number of interactions they successfully initiated (from ~~one~~ none to more than seven in a 1000 second period), in the number of peer directed vocalizations (0 - 15.7) and in their number of unsuccessful interaction initiations (0 - 8.7). Similarly the frequency of motor acts ranged from less than 1 to more than 26.

The variability of peer sociability was equally apparent in the proportional measures. For example, the percentage of individual toddlers' unsuccessful attempts to initiate social interaction ranged from zero to 53 percent. The proportion of the total social acts which were the child's varied from 26 percent to 68 percent. The percentage of the toddlers' social behaviors which were vocalizations varied from zero to 50 percent. Finally, the proportion of interactions initiated by an individual child ranged from 0 to 100 percent, with the proportion of interactions terminated by an individual child ranging from zero to 80 percent.

Relationship between P-DYAD and P-GROUP performance

With the documentation of the range of individual differences in the toddlers' social behavior, the second issue addressed was the possible stability in toddler rankings across two separate situations. For this

analysis, correlation coefficients were computed between DYAD and GROUP performance at 16, 19, and 22 months.

Significant correlations were found at each period (16, 19, and 22), with the number of significant correlations increasing over time. (See Table 2.) At 16 months, the individual toddlers performed similarly (i.e. had

Insert Table 2 about here

similar rankings) in DYADS and GROUPS in terms of the # of interactions (.882) and the percent of the total social acts that were the toddler's (.743). The percent of the total observation time spent in interaction (.745) and the percent of the actor changes that were the individual toddlers' (.862) were also significantly correlated at 16 months. At 19 months, similar rankings appeared for five of the dependent measures: # unsuccessful interaction initiations (.777), # interaction terminations (.686), % actor changes that are the toddler's (.964), % of the total social acts that are the toddler's (.817), and % of the child's acts that are vocalizations (.734). By 22 months significant relationships between P-DYAD and P-GROUP performance were found for eight of the measures: # of interactions (.719), # vocalizations (.911), # motor acts (.709), # successful interaction initiations (.820), # unsuccessful interaction initiations (.743), # interaction terminations (.709), % of unsuccessful interaction initiations (.875), and the % total social acts that are the child's (.908).

Stability of individual differences across time

In addition to correlations across situations, correlations were computed across time from 16 to 19 months and from 19 to 22 months. These correlations were computed for the P-DYAD and P-GROUP settings.

Consistency within the dyadic setting--Significant positive correlations were found across time in the toddler's behavior in the dyadic setting. These significant relationships were found only between 19 and 22 months, however. Between those two periods, the six toddlers were similarly ranked in terms of the # of interactions (.684), # motor acts (.708), # interaction initiations (.777), % interaction initiations (.749), # terminations (.807), % terminations (.815), % actor changes that were the toddler's (.873), and % of the total social acts that were the child's (.679).

Consistency within the group setting--Significant positive correlations were also found in the toddlers' social behaviors in the GROUP setting. Unlike the DYAD setting, however, these significant relationships were apparent between 16 and 19 months as well as between 19 and 22 months. Thus, between 16 and 19 months, the six toddlers were similarly ranked for the # of successful interaction initiations (.767), the # of interaction terminations (.800), the % interaction terminations (.779), and the % of the total social acts that were the toddlers' (.712). Between 19 and 22 months, similar correlations were also found for the # of successful interaction initiations (.827) and # of interaction terminations (.944). In addition, similar rankings were found for the total # of interactions (.820), and the # of unsuccessful interaction initiations (.974).

Discussion

As outlined in the Results, a wide range of toddler social interaction and behavior was found both in terms of frequencies and proportions. Thus, some toddlers initiated seven times as many interactions as did other toddlers. Similarly, while one toddler terminated none of his interactions, another toddler terminated fully 80 percent of the interactions he was involved in. Furthermore, while one toddler usually failed in eliciting a response from his intended social partner, another toddler was almost always successful.

The thrust of this diversity of responses is to suggest that important differences in peer sociability are apparent at least as early as 16 months. Some of the infants were very social with peers, while others were almost asocial. Although this statement may be seen as an unnecessary one, in light of the recent research, it is necessary. The normative descriptions and analyses, while addressing relevant and important questions, can lead one inadvertently to underestimate the individuality and diversity of social skills that are apparent in toddlers.

This range of responses seen in toddler's behavior with peers is particularly relevant to the development of an understanding of the nature of early peer interaction. For example, one might hypothesize that peer interaction represents an even, 50/50 proposition, with both social partners contributing to the social interaction. The range seen in the proportional measures would fail to support this hypothesis, however. Some of the toddlers contributed much greater proportions to the interaction sequences.

At the same time, these individual differences did not vary unsystematically or randomly. For example, those toddlers who frequently interacted in DYADs were the same toddlers who frequently interacted in the GROUP setting. Similarly, the toddlers who rarely initiated interactions during DYADs were the toddlers who rarely initiated interactions in the GROUP setting. The proportional measures were also correlated.

These similarities may be seen as supporting a limited "trait" hypothesis concerning sociability/nonsociability with toddler peers. At least such a configuration seems reasonable over the two playgroup settings and over the six month period; one can predict sociability across the two settings and three periods for the six toddlers.

One cannot assume that this sociability trait is completely stable over the six month period, however. The number of significant correlations between DYAD and GROUP performance increased from 16 to 22 months, making it appear that stability/consistency was strengthened over time.

The 16 to 19 month and 19 to 22 month correlations within the DYAD situation and GROUP situation also support the hypothesis of increased consistency over time. Between 16 and 19 months, there were no significant correlations in dyadic performance, but between 19 and 22 months the toddlers maintained significantly similar rankings for many of the measures. In the GROUP situation, the number of significant correlations also increased. Thus, it appears that developmental changes in terms of greater intra-individual consistency in peer directed behavior became apparent during the second year. This greater consistency parallels the greater consistency over time of agonistic and bimodal behaviors reported by Bronson for similar aged children.

With this evidence of inter-individual variability and intra-individual stability, additional questions concerning the nature of early peer interactions should be raised. In future studies one may want to consider the relationship between organismic factors such as activity level and temperament and the range of peer sociability. One may also want to examine the relationship between peer sociability and sociability with parents and siblings. Are infants who are sociable with peers also sociable with parents?

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Table 1

Mean and Range of Peer Social Behavior
in a DYAD and GROUP Situation

Measure		DYAD period			GROUP period		
		1	2	3	1	2	3
# interactions	$\bar{X}$	2.5	5.0	7.1	3.4	3.5	3.9
	range	1.5-3.5	1.5-7.7	3.5-10.2	1.8-5.3	1.1-8.8	1.1-9.7
% interaction	$\bar{X}$	1.0	5.0	4.8	2.1	2.1	3.3
	range	.6-1.6	1.3-7.2	1.9-8.5	1.0-5.4	.6-3.9	.4-6.1
# vocal	$\bar{X}$	3.2	9.2	4.9	1.3	2.5	3.7
	range	1.1-4.1	3.2-15.7	2.8-10.2	0-3.3	1.0-6.7	.5-11.3
% vocal	$\bar{X}$	40.2	40.7	26.0	13.8	19.3	29.0
	range	30-50	16-52	15-37	0-22	12-25	11-51
# motor	$\bar{X}$	4.8	13.4	14.3	8.2	9.1	11.7
	range	2.4-7.7	3.1-22.5	5.5-24.7	3.3-13.9	2.5-26.4	.5-23.3
# initiate	$\bar{X}$	1.3	2.5	3.6	1.7	2.1	1.8
	range	.3-1.7	.4-4.6	1.6-7.2	.4-3.3	.7-7.4	0-5.8
# terminate	$\bar{X}$	1.2	2.4	3.6	1.4	1.8	1.6
	range	.8-1.8	.6-3.6	1.4-6.5	.5-2.6	.7-5.2	0-5.8
% actor change	$\bar{X}$	48.5	48.7	48.5	51.8	49.2	47.2
	range	33-67	40-53	43-53	44-63	25-63	27-67
% total acts	$\bar{X}$	50.3	48.0	45.7	50.5	50.6	46.8
	range	40-66	31.62	34-56	36-60	25-62	25-68
# isolate	$\bar{X}$	2.8	2.2	2.6	2.0	2.4	2.1
	range	.9-6.3	1.7-3.5	.7-4.7	.7-4.0	0-8.0	0-8.7

Table 1 cont.

% isolate	$\bar{X}$	43.8	19.5	16.0	23.8	28.5	14.7
	range	25-70	8-42	7-22	11-35	0-53	0-43
% initiate	$\bar{X}$	52.7	51.0	46.2	49.8	52.7	32.5
	range	11-86	29-88	33-71	14-100	25-85	0-75
% terminate	$\bar{X}$	50.8	48.3	50.2	42.6	42.8	30.8
	range	29-73	41-63	35-67	13-80	25-61	0-67

Table 2
Summary of Significant Intercorrelations Across
Setting and Time

	DYAD vs. GROUP			DYAD		GROUP	
	16	19	22	16-19	19-22	16-19	19-22
# interactions	.822		.719		.684		.800
% interactions	.745						
# vocal acts			.911				
# motor acts			.798				
# initiate		.777	.820		.777	.767	.827
# terminate		.686	.709		.807	.800	.944
% actor changes	.862	.954			.873		
% total acts	.743	.817	.908		.679	.712	
% vocal		.734					
# isolate			.743				.974
% isolate			.875				
% initiate					.749		.751
% terminate					.815	.779	

p < .10 .619 - .707

p < .05 .708 - .860

p < .01 .861+

Appendix

Measures and Inter-observer Reliabilities

Terminology

Social Interaction

A series of at least 2 contingencies in which the social behavior of one child is responded to within 3-4 seconds by the second child's social behavior.

Social Behavior

Any act immediately preceded by, followed by, or accompanied by looking at another person. In the instances where an act is clearly directed to another person in the absence of looking is still coded as a social behavior. A single social behavior may include several acts (i.e. vocalizations and motor acts).

Interaction Initiation

The first social behavior in an interaction sequence.

Interaction Terminator

The person who fails to respond to the last social behavior in an interaction sequence.

Isolated Behavior

A social behavior that receives no response in 3-4 seconds.

Vocal Act

Any vocalization that is part of a social behavior.

Motor Act

Any motor act that is part of a social behavior.

Measures

Reliability

interactions

frequency of social interaction sequences .978

% interactions

proportion of total observation time spent .995

in interaction sequences

# initiation	Frequency of individual child's initiations of interactions	.888
% initiated	Proportion of interactions participated in by focal child that are initiated by the focal child	*
# termination	Frequency of focal child's interaction terminations	.961
% terminated	Proportion of interactions participated in by the focal child that are terminated by the focal child	*
# isolate	Frequency of focal child's isolated social behaviors	.925
% isolate	Ratio of focal child's # isolate/# isolate + initiate	*
# vocal	Frequency of focal child's vocal acts	.993
# motor	Frequency of focal child's motor acts	.972
% vocal	Ratio of # vocal/#vocal + motor	*
% actor changes	Ratio of FOCAL child social behaviors/Total social behavior	*
% total act	Ratio of (FOCAL CHILD vocal + motor acts)/ (FOCAL CHILD vocal + motor + other child in interaction vocal + motor)	*

* No reliability figures were calculated because this measure was derived from other existing measures.